Delay: As illustrated in Attachment A, establishing a collocation arrangement with the typical ILEC is a laborious, multi-step process.[40] Each of the steps listed in Attachment A has a specific interval which, when added together, create an overall interval of between 75-180 days before a physical collocation space is available for equipment installation.[41] Virtual collocation does not materially reduce these intervals. For instance, Bell Atlantic's internal objective in New York is to complete a virtual collocation arrangement within 105 business days.[42] Further, before the cage is operational, the CLEC's vendor must install the equipment in the collocated space and have the installation tested and accepted for service introduction.[43]

Cost: The cost of collocation is a serious problem. Although a portion of the cost problem can be traced to the *level* of the multiple charges specified above, a large part of the problem is simply caused by *unnecessary* costs created by ILEC policies. These include: (a) the requirement that each collocation enclosure be a minimum of 100 square feet; (b) the requirement that each space be caged; (c) restrictions on subleasing and sharing space; and (d) the need for security escorts, etc. Also, if a CLEC wishes to collocate in a central office where there has never been a collocation arrangement, that CLEC usually bears the full cost to prepare the area.

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[40] Bell Atlantic itself admits that "the process for establishing a physical collocation cage is complex and time consuming, involving a number of different disciplines." Affidavit of Karen Maguire, New York Public Service Commission Case No. 97-C-0271, November 3, 1997.

[41] The specific interval is heavily dependent on the particular ILEC and circumstances.

[42] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[43] Some ILECs have increased even these intervals by imposing other time-consuming, qualifying steps such as obtaining state certification or negotiating a complete interconnection agreement before the ILEC will begin the application process.

With virtual collocation, the CLEC saves the non-recurring cost of establishing the collocation cage, the non-recurring cost of the site preparation (if physical collocation site preparation was required) and the recurring cost of the floor space. However, these costs are replaced with other costs that the CLEC must incur when using a virtual collocation arrangement. The costs unique to virtual collocation include: (a) the recurring cost for equipment support and storage; (b) the non-recurring costs for training (if necessary); (c) equipment service; and (d) additional labor.[44]

Space Availability: Many central offices are at or near exhaustion of available space for collocation due principally to ILEC requirements (i.e. cages) which waste this important space. Often, a CLEC remains unaware of this lack of space until the ILEC responds to the CLEC's collocation application, adding further delay to its entry. To date, most collocation arrangements have been confined to urban central offices. As CLECs begin to expand their footprint into suburban and rural areas, the space availability issue will become significantly worse, especially considering that these secondary areas are typically served by smaller central office buildings. Though virtual collocation is frequently cited by the ILECs as the solution when "physical" space is unavailable, it is unknown whether there will even be "virtual" space in all the ILEC premises where a CLEC wishes to collocate.[45]

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[44] This listing does not take into consideration the costs associated with virtual collocation's principal disadvantage: the CLEC must surrender access to its own equipment to the ILEC. This action increases the cost of routine maintenance and could adversely affect the service quality provided by the CLEC to its customers.

[45] For instance, BellSouth plainly states that "[b]oth Virtual and Physical Collocation are made available on a first come, first served basis (depending on space availability), for interconnection to unbundled network elements, local interconnection trunking, access services and state tariff services as necessary for use by telecommunications service providers." Reply Affidavit of Pamela A. Tipton, Application by BellSouth Corp. for the Provision of In-Region, InterLATA Services in Louisiana. CC Docket No. 98-121, July 7, 1998, at 2.

The advent of xDSL technology can be expected to further stress the ability of ILECs to offer collocation space using traditional methods. xDSL technology has brought a new wave of entry to the local market by carriers interested in providing data services. Although the space needs (per central office) of CLECs using xDSL technology is often far less than the conventional 100 ft^2 minimum,[46] collocation by these carriers will consume scarce central office space if they are held to this obsolete requirement. Smaller, more efficient, collocation approaches will be necessary to accommodate these important new entrants.

Service Intervals: Each ILEC is constrained in the number of collocation applications that it can accept each month. This circumstance is partially due to the number of ILEC work groups involved in the current collocation application process and the availability of qualified vendors to construct the space and enclosures. In New York, Bell Atlantic stated that it can only provide "approximately 15 to 20 physical and/or virtual collocation arrangements per month across New York State."[47] Furthermore, if a CLEC submits more than eight (8) requests in a single month for a particular geographic area (Bell Atlantic has five of these geographic areas in NY), "the due dates for completion of the requested collocation arrangements will have to be negotiated and staggered."[48] Similarly, BellSouth will only respond to up to three (3) applications for space within the same state submitted within a fifteen (15) business day interval.[49] As the policies of

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[46] For instance, the DSL equipment that COVAD Communications seeks to collocate "... is no larger than an average stereo system." Comments of Covad Communications, New York PSC Case No. 98-C-0690 at 4 (June 15, 1998).

[47] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[48] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[49] When a CLEC submits more than three (3) applications in the same state within fifteen business days and BellSouth is processing multiple applications from other interconnectors, BellSouth and the CLEC are to negotiate a prioritization of the requests. See BellSouth Master Collocation Agreement 4.1.1.

these two ILECs demonstrate, CLECs are severely constrained by the number of collocation arrangements the incumbent can establish when multiple CLECs are seeking to collocate, or even a single CLEC is seeking multiple collocation arrangements. Considering the number of ILEC central offices (more than 23,000 nationwide), this constraint is significant.

The Additional Uncertainty of Virtual Collocation: Equipment Maintenance and Security. With virtual collocation, the fate of the CLEC's equipment rests in the hands of the ILEC. Although the CLEC has the ability to monitor its equipment, it must rely on ILEC technicians to perform routine maintenance and emergency repair work on the equipment. As a result, the CLEC has no control over the timeliness or quality of the work being performed. Furthermore, without access to its own equipment, it becomes difficult for a CLEC to coordinate a system-wide upgrade of its facilities with its equipment vendors.[50]

Together, the above factors increase the cost, reduce the flexibility and delay the availability of traditional collocation. Before turning to reforms which can correct these problems, however, it is useful to consider how the competitive market addresses these same concerns.

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[50] The basic design of modern telecommunications equipment can loosely be described as a "processor-driven frame" into which individual "line cards" are inserted to define a particular function or capability. This modular approach means that manufacturers can install upgrades by swapping "line cards" with newer versions. Of course, to effect such an upgrade requires that the CLEC be able to provide its manufacturer (or its own technicians) direct access to its equipment -- access that would be foreclosed (if not made far more difficult) by virtual collocation.

III. Learning from Collocation in Competitive Markets

Although collocation is extracted from an ILEC though legal obligation, it is a standard and favored business practice wherever competition is the prevailing market form. Long distance carriers, Internet providers and CLECs all have promoted collocation arrangements as an important and routine part of their businesses. Competitive collocation behavior can provide a useful template for reforming ILEC collocation practices.

A. The Long Distance and Internet Models

The competitive industry with the longest experience with collocation is the long distance industry. Early in its development, the competitive long distance industry learned the benefits of collocated network facilities for reliability, efficiency and cost. Network nodes became equipment "condominiums," with multiple carriers sharing points-of-presence.[51] These arrangements were intended to foster a cooperative relationship between the collocator and space provider, with the intent of establishing a strategic relationship that would lead to future sales of capacity.

The protypical provider of long distance collocation services during the early years of competition was WilTel, a carrier with a national network focused exclusively on providing wholesale long distance capacity to other retail providers. Today, as part of MCI WorldCom, this commitment continues with a strong policy favoring collocation. Like many CLECs and

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[51] A "point of presence" (POP) is a terminal point of an interexchange network where interconnection with the ILEC network for access service occurs. These and other locations where interexchange carrier transmission or switching equipment is located are generally referred to as "network nodes."

Internet providers, MCI WorldCom/WilTel does not even allow cages in the areas it has established for collocation due to the inefficient use of space that would result. Security is achieved through the use of the "locking cabinet" -- in fact, its standard collocation service is defined as space within a locked and vented cabinet.[52] Unlike ILEC collocation arrangements, competitive alternatives do not relegate each collocating carrier -- carriers which are, first and foremost, considered customers -- to its own caged environment. Equipment space is defined as rack (sometimes called an equipment bay) space to maximize available space and minimize cost.[53]

In addition to establishing the blueprint for future competitive collocation policies, the long distance example is instructive for another reason as well. When the ILECs are able to offer long distance services, they too will directly benefit from the competitive collocation policies favored by this industry. As the ILECs seek to collocate equipment on the premises of their interLATA transmission vendor, they will not be told -- indeed, in many instances, will not even be permitted -- to first establish a costly and inefficient cage. Rather, the basic "unit" of collocation will be the standard equipment rack(s), located alongside the equipment of other carriers. ILEC collocation practices should be reformed to achieve a similar symmetry between monopoly local, and competitive long distance collocation offerings.

The Internet model provides additional confirmation that security concerns in competitive environments are addressed without resorting to a mandatory cage. The Internet is more accurately viewed as a collection of networks which interconnect at a number of

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[52] In those areas where locking cabinets cannot be accommodated, MCI WorldCom/ WilTel still offers collocators rack space, despite the lower level of security such arrangements afford.

[53] Recognizing that some locations have limited space, some long distance carriers limit collocation to customers purchasing a minimum amount of capacity such as a DS3.

Network Access Points (NAPs). These NAPs are analogous to a collocation arrangement, since multiple carriers locate equipment in these centers. Typically, these Network Access Points (such as MAE East and MAE West) operate as "collocation farms", with each carrier's equipment located side-by-side in a completely uncaged environment. Security is typically provided by restricting access to technicians that are issued "smart-cards" which automatically register the time and place of entry, and remote video surveillance from a network control location located hundreds (and, in some instances, thousands) of miles away.

The Internet example is particularly useful to judge the reasonableness of any claim that cages are necessary for security. It is estimated that the MAE East interconnection point alone handles more than 60 percent of all *worldwide* Internet traffic (including 85 percent of all intra-European traffic), and roughly 40 percent of US domestic traffic.[54] Consider the significance of these statistics. The Internet is as vital to commerce as the traditional voice network, yet its providers have never accepted the premise that each provider must be isolated to its own, uniquely secure, environment.

The principal lesson is that the collocation practices found with the typical ILEC are an aberration when viewed from an industry perspective. The caged-environment that is so central to the ILEC model, has no precedent in competitive markets, even though similar security concerns apply. The difference is not with the *concern* for security, the difference lies in defining what security measures are *reasonable.*

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[54] Internet Affidavit of Robert G. Harris, CC Docket 97-211 at 29 (Petition before the FCC to Approve the MCI WorldCom Merger) (filed March 13, 1998) at 29 (citing John C. Dvorak, "Breaking Up the Internet Logjam", *PC Magazine* at 87 (April 8, 1997); and P. Merrion, "What a Tangled Web Users Weave", *Crain's Chicago Business* (December 9, 1996).

B. Collocation Choices Offered by Competitive Local Exchange Carriers

Perhaps the most relevant template for competitive collocation can be found in the local market itself with the actions and offerings of the CLECs. Unlike the ILECs, competitive entrants have no desire to foreclose access to their networks by customers, including other carriers. As a result, the CLEC industry approaches collocation with the goal of accommodation and the desire to make their networks and space as accessible as possible. In the CLEC community, collocation is a *product* -- a product like all others which needs to be provisioned inexpensively, rapidly, and with a minimum of complication and cost.

The basic collocation offering of a typical CLEC *is not* caged collocation.[55] The CLEC industry recognizes that customers have differing requirements, with only some customers requiring caged space. The central goal of collocation is the placement of equipment -- equipment which increasingly requires rack space, not floor space, to meet the customer's needs. Although some CLECs provide customers the choice of a caged space,[56] the standard CLEC offering is defined as rack or cabinet space, or, alternatively, floor space offered in increments sized to accommodate standard racks and equipment bays. The purpose behind this offer is simple. Uncaged collocation space can accommodate far more collocation customers than a caged environment. A competitive firm views the efficient utilization of its space as an important objective because it *wants* to attract collocation customers.

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[55] As noted earlier, several providers (MCI WorldCom/WilTel and Intermedia to name a few) do not even offer a caged option.

[56] For instance, although ICG Communications offers potential customers the option of a caged environment, it discourages this option due to the inefficient use of space.

Notably absent from the competitive collocation product line is the paradox known as "virtual collocation." In essence, virtual collocation is a byproduct of the ILEC's insistence on caged collocated space. The justification for virtual collocation is that sufficient space for a collocation *cage* does not exist. However, space is available for the collocated *equipment*. The ILEC's virtual collocation "solution" is to collocate the equipment, but to deny the entrant subsequent access for maintenance or upgrade.[57] In contrast, the competitive solution is to make the equipment space directly accessible by offering uncaged space, including rack space itself.

Like the long distance and Internet examples cited above, security concerns in competitive collocation arrangements are addressed through common-sense means: clearly identified equipment, locking cabinets, card access, and escorted access. For those CLECs which require escorted access, it is typically included in the non-recurring charge associated with the initial installation of collocated equipment.[58]

Competitively provided collocation arrangements are also sensitive to the customer's need for speedy implementation, even in those relatively complex instances where a cage is requested by the collocator. The following describes the procedure and intervals used to establish a collocation cage offered by a typical CLEC:

* A potential customer requests collocation space, filling out a simple 5 page questionnaire with the help of a salesperson.

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[57] As explained above, this result is accomplished by leasing the equipment to the ILEC and relying on ILEC technicians for subsequent work.

[58] For instance, ICG provides its collocated-customers or their vendors four hours of escorted access to initially install equipment as a standard feature of its collocation service.

* The regional VP overseeing collocation space approves/rejects the collocation request within 5 days.

* Customer/commissioned-salesperson completes collocation agreement and forwards it to legal department.

* Legal department has 5 days to complete review of collocation agreement.

* The standard provisioning interval for caged collocation space is 30 days.

This standard procedure can deliver a fully prepared collocation cage to a customer within 40 days -- far less than the time it takes a typical ILEC to provide a similar environment. For instance, Bell Atlantic's *construction* interval alone is 76 business days, while US West cites 90 calendar days, and BellSouth and Pacific Bell have 120 calendar day intervals -- and these intervals do not include the additional time consumed by the application and acceptance processes.

C. Lessons from Competitive Collocation

As noted above, the competitive experience has given rise to set of collocation choices quite different than that found in ILEC agreements. Competitive collocation arrangements are simple, customer-oriented and affordable. The key lessons from the competitive paradigm can be summarized as follows:

Rack Space or Floor Space: Competitive collocation arrangements begin with the recognition that not all entrants desire floor space. Many entrants have simpler needs, desiring only the ability to lease rack space to mount equipment. Although floor space is an option, floor space is offered in increments small enough for an entrant to mount its own rack (i.e., equipment bay) without the inconvenience and cost of caged-space.[59]

Security: Competitive collocation arrangements approach security with a large measure of common sense. The first level of security is *labeling* -- by properly labeling equipment, mistaken contact will be avoided. Competitive collocation arrangements also provide customers with the option of protecting their equipment with a locking cabinet. Additional security is provided by card-access that tracks when technicians have had access to the common space, or in some instances, access escorted by the CLEC/IXC technician.

Sharing: Because competitive collocation arrangements are so flexible, there is less need to share space. Nevertheless, competitive collocation arrangements do not typically limit a customer from sharing its equipment or space with another carrier.

Restrictions: Competitive collocation arrangements do not generally limit the services or uses of collocated equipment by a carrier.

Reasonable Prices: Competitive collocation arrangements are intended to *encourage* collocation and prices reflect that basic desire. Table 4 outlines the typical pricing available

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[59] To place this distinction in perspective, even Bell Atlantic acknowledges that the space required for an entire rack/bay of collocated equipment requires only 15 ft^2 of floor space, far less than the 100 ft^2 minimum associated with conventional collocation. See Bell Atlantic New York, *Secured Collocation Open Physical Environment (SCOPE) Service Description* at 3 (June 23, 1998).

from CLECs and IXCs for the standard competitive offering (i.e., a collocated equipment rack in common collocation space):

Table 4:
Summary of Competitive Collocation Pricing
(Prices Applicable to a Collocated Rack in Common Space)[60]

Carrier	Recurring	NRC	Power	Comment
A	$300	$1,000	$280/rack	$25 charge for 2 access cards.
B	$975	$1,000	Included	2 rack minimum, cabinet provided.
C	$700	N/A	Not Cited	Includes cabinet.
D	$500	$2,000	Included	
E	$700	$1,000	$40 per 5 amp	2 year minimum term.
F	$400 $1,000	$4,000 $8,000	$15 per amp	26" by 18" rack 42" by 30" rack
G	$1,135	$2,287	Included	2 rack minimum.
H	$675	$5,500	Included	Term discounts available.
I	$400	$525	Included	Rate does not include cabinet.

With this basic description of competitive arrangements serving as the template, it is now appropriate to turn to specific proposals to reform ILEC collocation policies.

[60] The pricing information outlined in this table has been compiled by CompTel to illustrate the general range of competitive collocation prices offered by CLECs and IXCs. Prices from any individual carrier in any particular market will vary.

IV. Recommended Collocation Reforms

A. Cageless Collocation Options

The traditional vision of collocation -- a dedicated cage equaling 100 square feet -- is unnecessarily costly and inflexible, particularly when compared to the collocation profile of new technologies. Continual advances in microelectronic circuitry translate to an interest into collocating equipment of decreasing dimension and increasing functionality. Further, as competition expands beyond urban markets to areas with smaller central offices and lower density, there will be a corresponding need for more efficient and less costly collocation options. Traditional collocation rules which isolate CLECs in dedicated, caged space or which limit the types and uses of collocated equipment are inconsistent with these fundamental trends.

The principal impediment to cost-effective collocation is the ILECs' insistence that physical collocation equates to a dedicated, caged environment. The practice of caged collocation, however, is nothing more than an ILEC convention, born at a time when potential collocators were first entering the market and had few legal rights.[61] There is nothing in the Telecommunications Act of 1996 that requires (or even suggests) that the entrant's right to physical collocation should be constrained to a caged environment.[62] The single most important reform of ILEC central office collocation policy is the elimination of the mandatory cage.

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[61] See discussion supra Section II.

[62] Section 251(c)(6) describes the ILEC's obligation to provide collocation:

> The duty to provide, on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, for physical collocation of equipment necessary for interconnection or access to unbundled network elements at the premises of the local exchange carrier, except that the carrier may provide for virtual collocation if the local exchange carrier demonstrates to the State commission that physical collocation is not practical for technical reasons or because of space limitations. U.S.C.A. 251 (c)(6)(west supp. 1996).

There are two basic approaches to cageless central-office collocation:

Shared Space Cageless Collocation: This form of cageless collocation establishes a "shared area" that is dedicated to the collocation of CLEC equipment. This shared area would be separated from ILEC equipment, but within the shared area, the equipment of individual CLECs would be collocated side-by-side without the imposition of cages or other walls. These shared areas would be fully accessible to the CLECs' authorized employees or agents for installation, maintenance and repair. Shared Space collocation options include space on pre-installed racks as well as floor space increments flexibly sized to allow an entrant to install its own dedicated rack.

Bell Atlantic has recently proposed offering a "shared space" arrangement in New York. In addition, both US WEST and BellSouth offer arrangements which allow CLECs to collocate equipment in a common area without cages. These offerings prove that cageless collocation is technically feasible and appropriate.[63]

Common Space Cageless Collocation: Common Space cageless collocation allows the CLEC to install its equipment within the same conditioned environment as the ILEC's equipment. CLECs would be provided identified space within the central office, in the same environment as the ILEC's equipment, but with sufficient physical separation (i.e., a specific aisle) to clearly distinguish CLEC from ILEC equipment. With respect to equipment location, Common Space cageless collocation would be similar to virtual collocation. Significantly, however, the CLEC

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[63] Although as previously indicated, such options are not appropriate for combining unbundled network elements. See *Broadening the Base: Combining Network Elements to Achieve Widespread Local Competition,* July 1998, Section III B.

would not be dependent on the ILEC to install, maintain and repair its equipment -- the penalty today imposed with virtual collocation.

The principal benefit of Common Space collocation is that it uses space most efficiently. This characteristic is becoming increasingly important as the space available to establish CLEC-only areas becomes more limited or exhausts entirely. For instance, Bell Atlantic has indicated that of seventy (70) central offices it surveyed for collocation space, seventeen or 24% no longer have space for dedicated physical collocation.[64] Furthermore, under the Common Space collocation option, there is no meaningful difference in the space used by the ILEC and the CLEC, thereby best satisfying the 1996 Act's requirement for nondiscrimination.[65]

Either cageless option would be more desirable than a traditional collocation arrangement because both should result in lower cost. Cageless collocation should be less costly than traditional physical collocation because it uses space more efficiently, and reduces (if not eliminates) construction costs associated with cages, segregated access and conditioning. These cageless options should be less expensive than virtual collocation because there is no need to train ILEC technicians or pay inflated ILEC charges for routine maintenance or system upgrades. Most importantly, these options allow the CLEC to remain independent from the ILEC for the *quality* of the service, as well as the *types* of services, the CLEC provides its customers.

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[64] April 15, 1998 letter from Bell Atlantic to the New York Public Service Commission. Although there are 522 Bell Atlantic central offices in New York State, Bell Atlantic only reported the availability of physical and virtual collocation in the 70 offices listed in its letter. It is unclear what the status of available space is in the remaining 452 offices. Of the 70 surveyed, 57 were located in the New York Metro LATA.

[65] This option should eliminate all potential areas of discrimination, except for price.

Table 5 compares the Shared Space and Common Space cageless options to traditional virtual and physical collocation. This table illustrates how cageless options combine the best features of the traditional methods:

Table 5: Comparing Traditional Collocation with Cageless Collocation Options

Attribute	Traditional Physical Collocation	Traditional Virtual Collocation	Shared Space Collocation	Common Space Collocation
Basic Unit of Collocation	100 ft^2 Cage		Dedicated Equipment Bay/Rack, Shelf Space in Common Rack	
Collocator-Space Separated from ILEC?	Yes	No	Yes	No[66]
Restrictions on Sharing?	Yes	Yes	No	No
CLEC-Access to Equipment?	Yes	No	Yes	Yes
CLEC Owns Equipment?	Yes	No	Yes	Yes

The issue most relevant to the introduction of cageless collocation is security. As discussed earlier in this paper, it is important to appreciate that security is not an absolute concept. Rather, there are differing levels of security have been found that do not require

[66] It is expected that the CLEC's equipment would not share the same rack/bay as the ILEC's equipment. The degree of separation between the CLEC's equipment and the ILEC, however, should be the minimum amount necessary to establish a clear identification of each's equipment.

physical cages with increasing levels of protection and cost. The important goal is to achieve a reasonable balance between prevention and risk.

As a threshold observation, it is important to recognize that access to central office space is already controlled. The issue is not *providing* a secure environment, but *sharing* that secured environment without diminishing its effectiveness. As a result, the security question relevant to both cageless collocation options[67] is how to best provide multiple carriers with access to shared/common space, while protecting each carrier's equipment to the maximum extent reasonable. Consequently, the security alternatives presented below are principally intended to address security within the shared/common area, with the expectation that access to the space is already effectively controlled.[68]

Labeling: The most common risk is human error, a risk that exists independently from collocation. To prevent human error, the simplest form of security is proper labeling to which assures that a technician can easily identify its equipment. Although this security measure may seem overly simplistic, it is considered one of the most useful measures by technicians in the field.

Verified Access: One effective security measure is the ability to identify with precision those technicians with access to the shared/common area at the moment trouble occurs. A variety of means can be used to reasonably track access, including: manned access with sign-in, or more

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[67] The security issues presented by the Shared Space and Common Space collocation options are effectively the same. The only difference between the options is the inclusion of a single additional carrier's equipment, the ILEC. Increasing the number of collocators by one, however, should not change the need to establish a security solution acceptable to the industry as a whole.

[68] Several of the listed security approaches are not mutually exclusive, but may rather be used together or in combination.

efficiently, access controlled by a "smart" key card. Smart card entry automatically records who entered the space, the date and time they entered, and the time they left. As a result, the smart card data would provide the ILEC/CLEC with the details of who (including the ILEC's own employees) was in the area at the time of failure. Verified access is a popular security measure in competitive applications, including the principal security measure (with remote surveillance) used at the Internet's Network Access Points.

Video surveillance/recording: Remote measures can also be used to improve security. The principal purpose for these surveillance systems is to assist in the positive identification of any security violation. Consequently, there is no need for real-time surveillance. Instead, cameras could feed continuous recording systems for later review.

Bonded Access: To ensure that each carrier has the appropriate incentive to carefully train its employees/vendors, it may be reasonable to require that technicians with access to the common area be bonded. This approach could be combined with a set of predefined penalties for clear violations of common area policies, such as movement beyond the approved area in the case of the Common Space option.

Escorted Access: A more aggressive security measure is escorted access. This arrangement requires that a technician be escorted whenever he or she is in the common area. This approach may be viable in large offices where manned security is readily available at a reasonable cost. Of course, even where access is escorted, it should not require a highly trained and costly ILEC technician. The function of the escort is simply to assure that the CLEC's technician works only on its equipment -- equipment which should be clearly labeled. This basic escort function can be performed by the ILEC's security staff (e.g., normal building entry guards, where available) at a cost far more economical than the cost of a trained ILEC technician.

Locking Cabinets: The most prevalent form of security in competitive collocation arrangements is the use of locking cabinets. While the locking cabinet is a prevalent form of *potential* security, reports from the field indicate that these cabinets are generally *unlocked*, providing further evidence that the practical concern with security is less than that typically described in a regulatory context.

Third Party Access: Although the most common risk is human error, ILECs have expressed continuing concern regarding deliberate conduct that would harm their equipment. One approach to address this concern is to limit access to third parties who would provide installation, maintenance and repair services. Because the ILEC would represent the largest potential customer of such third-party vendors, these vendors would have a substantial incentive to make sure that their technicians operated professionally.[69] It may even be reasonable for the ILEC to establish a certification procedure for third-party vendors -- assuming that such a procedure can be conducted rapidly and efficiently.

The point of the above list is to demonstrate that reasonable security concerns can be addressed through reasonable means. Security does not justify limiting physical collocation to a caged environment. Cageless alternatives are less costly, they can be provisioned more rapidly, and they use space more efficiently. As such, it should be no surprise that they are the favored collocation arrangement in competitive applications.

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[69] One should also expect that CLEC technicians -- technicians that are frequently former ILEC employees -- will operate in a professional and cautious manner.

B. Improving Traditional Collocation

In addition to offering new forms of cageless physical collocation, there are a number of simple reforms that can be adopted to improve traditional collocation. The following measures are intended to improve the CLECs' ability to obtain traditional collocation arrangements in a more efficient, timely and economical manner. In some instances, our proposed reforms are already agreed to by one (or more) ILECs, but are not yet a national norm.

Improve Available Space:[70] When a CLEC is denied a collocation arrangement as a result of the lack of available space -- or if the ILEC publishes a report indicating that no space is available for collocation in specific central office(s) -- the following process should be required:

* The ILEC should provide the state commission and any requesting CLEC with a detailed floor plan of the central office(s) where they claim no available space. This plan should identify all floor space in the central office, how it is currently being used, and what space, if any, is reserved for future use. Furthermore, the plan should indicate what equipment, if any, is retired in place.

* Space used for functions that can be established outside the central office (e.g. administrative offices), or space being occupied by obsolete equipment, should be reassigned and made available for collocation.

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[70] In addition to the reforms cited here to improve available space, regulators should be aware that ILECs frequently pursue policies that deliberately waste collocation space, thereby artificially creating potential shortages. The most offensive of these strategies is the position that entrants must obtain collocation space in order to combine network elements. CompTel addressed this issue in detail in an earlier White Paper, however, and will not repeat its analysis here. See (*Broadening the Base: Combining Network Elements to Achieve Widespread Local Competition*, July 1998).

* CLECs and the state commission should be allowed to conduct a walk-through in any premise where collocation is being denied. If the CLEC finds space that would be suitable for its collocation, the ILEC should be held to a rebuttable presumption that such space can be made available.[71]

* Available space should be assigned on a first-come, first-served basis. In no instance, however, should an ILEC affiliate be permitted to obtain more than 1/3 of the available collocation space in any central office.[72]

* CLECs are bound by strict rules that prevent them from warehousing collocation space.[73] In addition to these rules, however, the cost of collocated space to the CLEC also prevents it from inefficiently reserving space for potential future purposes. Because collocation charges do not provide a comparable incentive for the ILEC (or any wholly owned affiliate), regulators must establish (and enforce) clear rules limiting the warehousing of space by the incumbent.[74]

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[71] Of course, there should be no charge for conducting a walk-through.

[72] The potential existence of an ILEC-CLEC affiliate raises a number of serious issues, most of which are beyond the scope of this White Paper. The intent of this rule, however, is to assure that at least two legitimate competitors, equal in size to the ILEC's affiliate, are able to collocate and compete.

[73] There are typically not, however, systematic reporting requirements that would help enforce such rules.

[74] Existing federal rules do not provide sufficient guidance in this area. For instance, the Local Interconnection Order para. 604 states:

> Incumbent LECs are allowed to retain a limited amount of floor space for defined future uses. Allowing competitive entrants to claim space that incumbent LECs had specifically planned to use could prevent incumbent LECs from serving their customers effectively. Incumbent LECs may not, however, reserve space for future use on terms more favorable than those that apply to other telecommunications carriers seeking to hold collocation space for their own future use.

This provision fails to recognize that CLECs have no economic incentive to inefficiently warehouse collocation space, and therefore strict rules need not apply. In contrast, an ILEC's claim that it has

Smaller Physical Collocation Arrangements: Most ILECs have a minimum space requirement of one hundred (100) square feet for traditional physical collocation. This requirement can force a CLEC to purchase more space than it needs, wasting scarce collocation space. Collocating CLECs should be able to purchase caged space in more flexible increments, such as a twenty-five (25) square feet minimum with additional space available in ten (10) square foot increments.[75]

Improvement on Intervals and Throughput: ILECs should be required to conduct "pre-request" site surveys to identify offices with potential limitations on collocation. ILEC offices should be prioritized based on forecasts received from CLECs. A pre-request survey process should provide advance warning if space is not available or requires conditioning, thereby reducing the provisioning interval once an order is received from a CLEC.

The ILECs should also take positive measures such as contracting with additional vendors to allow for a quicker turnaround of collocation arrangements.[76] The ILECs should make every effort to identify and certify additional third-party vendors who will be available to meet collocation demands. In addition, standardized service intervals (comparable to the competitive intervals shown above) should be established for each step in the collocation

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reserved space for a future use can create an effective barrier to competition without imposing any real cost on the ILEC other than the "opportunity cost" of lost collocation revenues from the CLEC.

[75] Bell Atlantic has recently agreed to provide CLECs with collocation cages smaller than the standard 100 ft^2 minimum.

[76] Bell Atlantic, for instance, has admitted that "[o]ne constraining factor for both BA-NY and the collocators is the availability of technically-proficient, qualified third-party vendors." Affidavit of Karen Maguire, New York Public Service Commission Case No. 97-C-0271, November 3, 1997.

process. The goal should be a clearly defined collocation product, and not the case-by-case, central office by central office, practice that exists today.

Remove Unnecessary Restrictions on Equipment Type and Use: Most ILECs limit the type of equipment that can be collocated to transport equipment. These restrictions do nothing but create a competitive barrier that adds costs and delay for the CLEC as well as allow the ILEC to control the pace at which new technologies are deployed. CLECs should be able to collocate *any* type of equipment that will allow them to compete effectively with the ILEC. The sole criteria that should determine what equipment can be collocated should be the size of the equipment, and the available space. It makes no sense to prohibit a remote switching unit, for instance, which would generally require no more space than the transport equipment it replaced.

In addition, CLEC should be free to use its collocated equipment free from any artificial restrictions placed on it by the ILEC. Bell Atlantic has taken the position that a CLEC can install a remote switching unit, but that the equipment cannot then be used for switching. Pacific Bell has placed a similar (but somewhat less constraining) restriction on remote switching units installed in collocated space. Pacific will allow the remote switching unit to switch calls within the office, but it may not terminate traffic to another switch. Both examples are restrictions with no technical rationale -- they are simply attempts to competitively hamper the CLEC by preventing it from using the full capability of its investment. In contrast, SBC allows CLECs to both install and fully use collocated remote switching units.

Remove Restrictions that Prevent Shared Collocation Space: Any restriction which prevents a CLEC from sharing or subleasing collocated space should be removed. These restrictions serve no valid technical or security purpose. Rather, they unreasonably increase costs for smaller CLECs and can lead to the premature exhaust of usable space through inefficient

utilization. Implementing shared collocation is straight-forward. The ILEC simply continues to collect collocation-related charges from the primary CLEC, while orders for individual network elements or interconnection facilities would be billed to each CLEC sharing the facility. Both US WEST and Bell Atlantic (in New York) now allow carriers to share collocation space, albeit on terms which may be unnecessarily restrictive.[77]

Reduce the Cost/Price of Providing Collocation: Collocation costs today vary widely from ILEC-to-ILEC and state-to-state. Many of these rates bear little relationship to their underlying cost.[78] Of course, it is important that regulators carefully scrutinize the underlying cost basis of any charges. It is equally important, however, to remove any policy or practice which creates unnecessary costs.

Finally, a more equitable process for allocating cost to the CLECs for the preparation of unconditioned space must be developed. Under current procedures, the initial cost of space preparation is levied entirely on the first CLEC that requests space. This CLEC receives a prorated rebate as other CLECs collocate in the office. A preferable alternative would be for the initial CLEC to pay site preparation costs based on the percentage of the total space it is occupying.[79] As additional CLECs collocate, the ILEC would assess each a site preparation fee

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[77] For instance, requiring that one CLEC accept responsibility for all recurring charges billed on facilities terminated to a single cage.

[78] For example, there is no justification for *recurring* cross-connection charges. The typical cross-connect is a pair of wires anywhere from 20 to 200 feet in length, connected to terminals on a frame. Once the manual *non-recurring* work is performed to run the wires and establish these connections, there is no reason for a continuing *recurring* charge. Each cross-connection takes a minimal amount of space, and generally requires no maintenance (assuming they were installed correctly and have not been disturbed by further frame activity).

[79] For example, if an ILEC spends $300,000 to condition a one thousand square foot collocation space, and the first CLEC uses ten percent or one hundred square feet of this total, then

based on the amount of space each CLEC occupies. This is the general approach now used by Bell Atlantic in New York and there is no reason that other ILECs (and Bell Atlantic in its other states) cannot conform to this standard.[80]

V. Conclusion

The typical progression of regulatory policy is to begin with the simple and then, with the advantage of experience, implement reforms of increasing sophistication and complexity. In the case of collocation, however, the opposite evolution is appropriate. The prevailing framework for physical collocation -- the dedicated caged environment -- is inordinately expensive, slow and inefficient.

The most significant improvement to collocation can be made by simply eliminating the ILECs' policy that physical collocation requires a cage. The nondiscriminatory access to an ILEC's premise guaranteed by the 1996 Act is best satisfied by providing CLECs access to the *same* space as the ILEC, without the cost or complication of a cage. Cageless collocation is the standard in every competitive application -- in the long distance industry, in the Internet industry and with CLECs themselves. It is now time for this competitive standard to become the standard offering of the ILECs as well.

In addition, there are a number of actions which can improve both caged-physical collocation and virtual collocation. Several of the reforms we recommend in this paper have

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the CLEC would be charged ten percent (i.e., $30,000) for site preparation.

[80] CompTel does not endorse, however, that component of the New York plan which would allow Bell Atlantic to reallocate the cost of unused space if future demands fall short of expectations.